

Distributed vs. Centralized Energy

Since electricity in the U.S. comes mostly from coal, we'll look at how that system works. First, heavy diesel machinery digs up coal in massive quantities, crushes it and loads it into a diesel train bound for a power plant. Often, that power plant is many hundreds of miles away. There, the coal is burned to release heat along with CO₂ and several other nasty pollutants. The heat boils water, which creates steam, which turns a turbine and finally generates electricity. The electricity is then pushed through high-voltage lines, often for hundreds of miles more. Finally, the voltage is dropped down at a substation and sent through wires to your house; where you plug in your toaster.

This is not a simple system, although it does succeed in turning your bread into toast in the end. Because of all the energy used by machinery or leaked out through power lines along the way, your toaster will receive less than 30% of the original energy in the coal. This is what's called a **centralized generation** system, where electricity is generated centrally in large amounts and then sent out through power lines to a large number of houses and businesses.

Imagine instead a neighborhood where every house is covered in solar panels, making each one into a small power plant capable of powering itself and even helping the neighbors when they need a bit of extra electricity. This is **distributed generation**, and it is one of the advantages of renewable energy systems on a domestic scale.

Renewable energy is very flexible because it can be used in small systems for distributed generation or in truly massive installations for centralized generation. Or in any size of system in between. Of course, fossil fuels can be used in either type of system as well, but you don't see many people trying to run their homes using a private coal plant (or even a diesel generator) due to the cost, the noise and the smell.

"The issue of climate change is one that we ignore at our own peril. There may still be disputes about exactly how much we're contributing to the warming of the earth's atmosphere and how much is naturally occurring, but what we can be scientifically certain of is that our continued use of fossil fuels is pushing us to a point of no return. And unless we free ourselves from a dependence on these fossil fuels and chart a new course on energy in this country, we are condemning future generations to global catastrophe."

President Barack Obama



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